

Maryland's 5th Large-Scale Restoration Tributary

Manokin River Sanctuary

Manokin Sanctuary

Location- lower Eastern Shore, emptying into the Tangier Sound

High salinity area (>14 ppt)

Sanctuary created in 2010

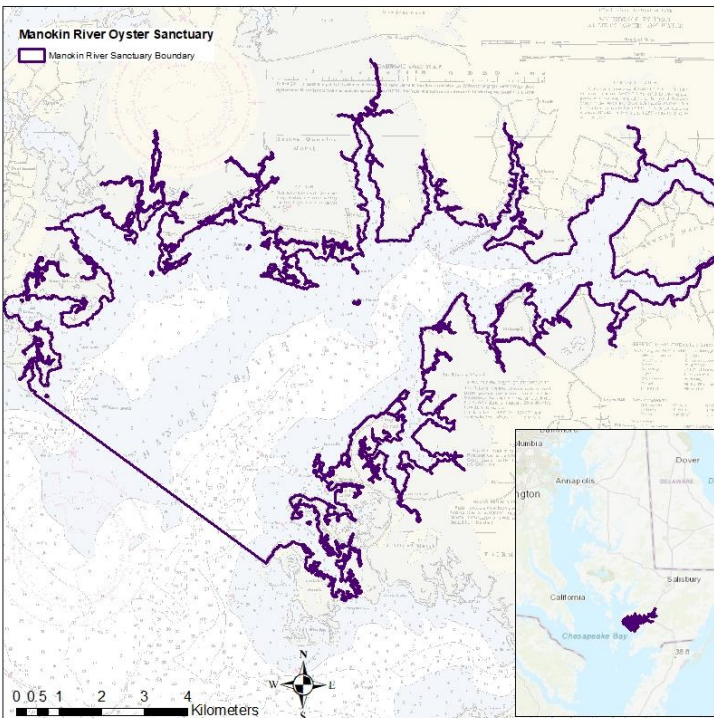
Surface acres: 16,320

Historic Oyster Bottom: Yates bars 5,015 acres (plus amendments 11,040 acres)

2014 Chesapeake Bay Agreement- MD committed to restoring oyster populations in 5 tributaries in MD's portion of the Chesapeake Bay by 2025.

DNR recommended the Manokin sanctuary as the 5th large-scale tributary for restoration towards fulfilling the Chesapeake Bay Agreement in September 2018.

It was accepted as the 5th MD tributary by the Fisheries Goal Implementation Team in June 2019.



Restoration Goals



A successfully restored reef should have:

- 'Minimum threshold' of 15 oysters and 15 grams dry weight per m² covering at least 30 percent of the target restoration area at six years post restoration;
- 'Target' of 50 oysters and 50 grams dry weight per m² covering at least 30 percent of the target restoration area at six years post restoration;
- Two or more oyster year classes present; and
- Stable or increasing spatial extent, reef height, and shell budget.

A successfully restored tributary is one where:

- 50 to 100 percent of the currently restorable oyster habitat (CROH) has oyster reefs that meet the reef-level metrics above (restorable habitat is defined as the area that, at a minimum, has appropriate bottom quality and water quality for oyster survival), **and**
- 8 to 16 percent of historic habitat (Yates Bars), and preferably more, has oyster reefs that meet the reef-level metrics above.

Restoration Treatments



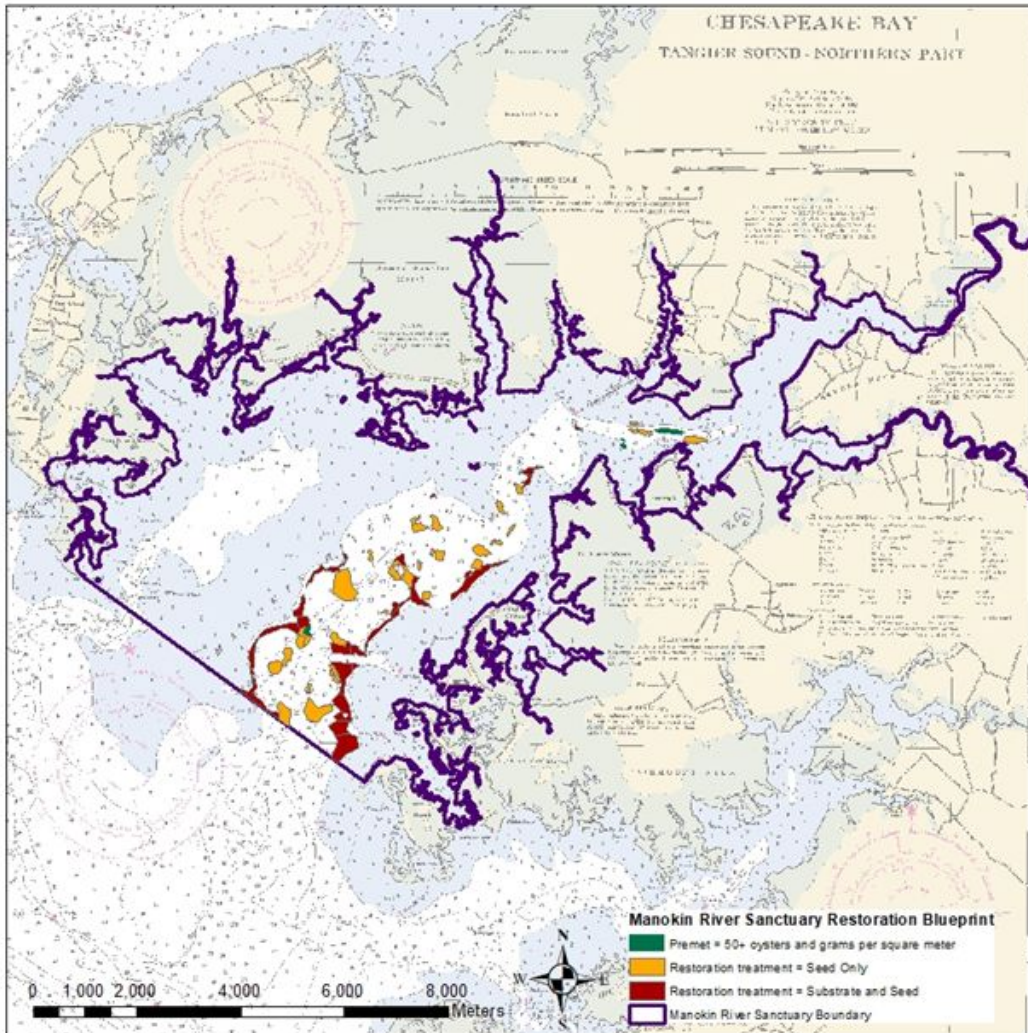
Seed Only - *only Seed Oysters are planted when:* hard substrate reef base naturally exists, current population is at 5-50 oysters per square meter

Substrate and Seed - *substrate and seed are planted when:* hard substrate is required on the site, current population is <5 oysters per square meter

Premet - *no plantings occur when:* site already meets the Oyster Metrics density and biomass targets >50 oysters and grams per square meter

Control - Reefs left unrestored (untreated) to serve as comparisons to restored (treated) reefs

Blueprint Map



Restoration Acres Available

(all values are preliminary)

Seed Only: 284 ac

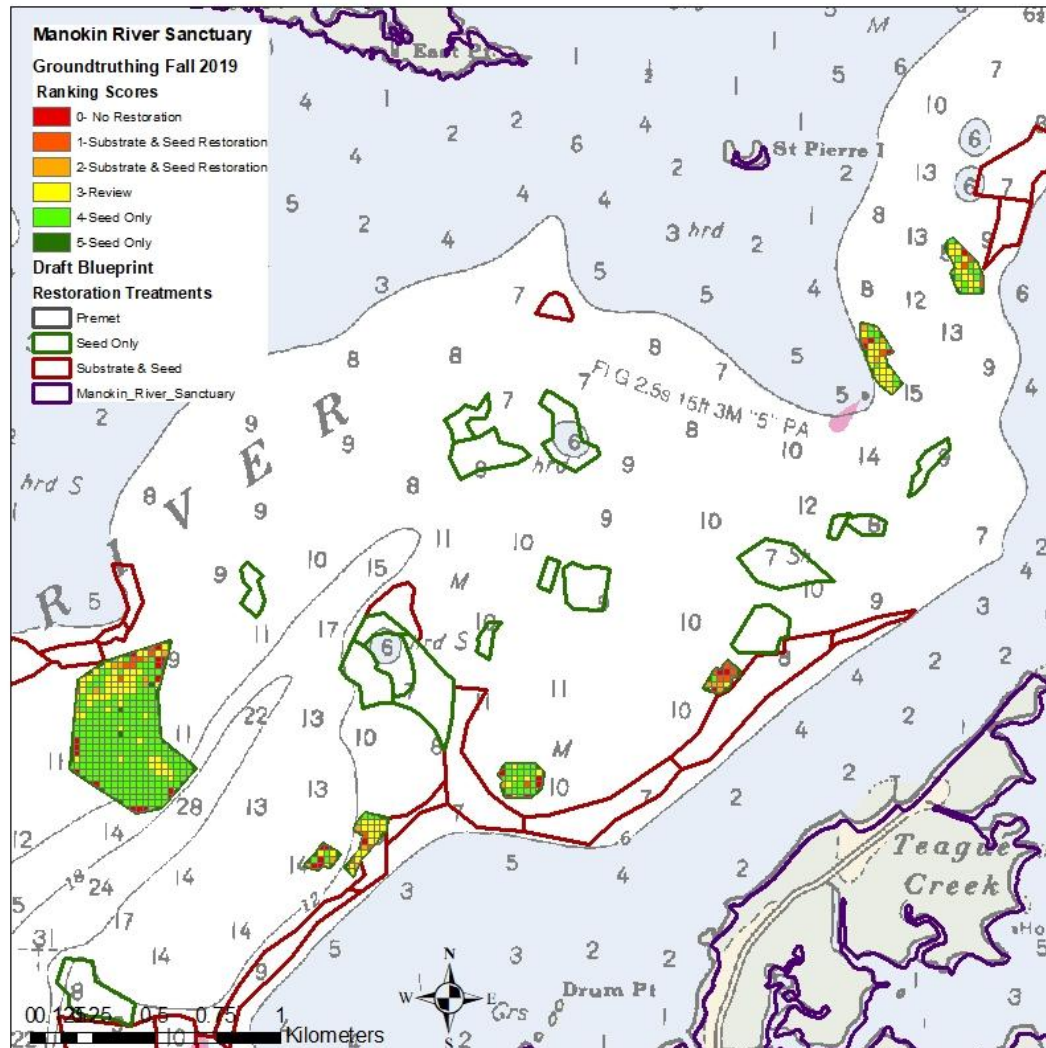
Substrate and Seed: 333 ac

Premet: 20.1 ac

Total Available: 637 ac

Restoration Target: 441 ac
(75.5% CROH)

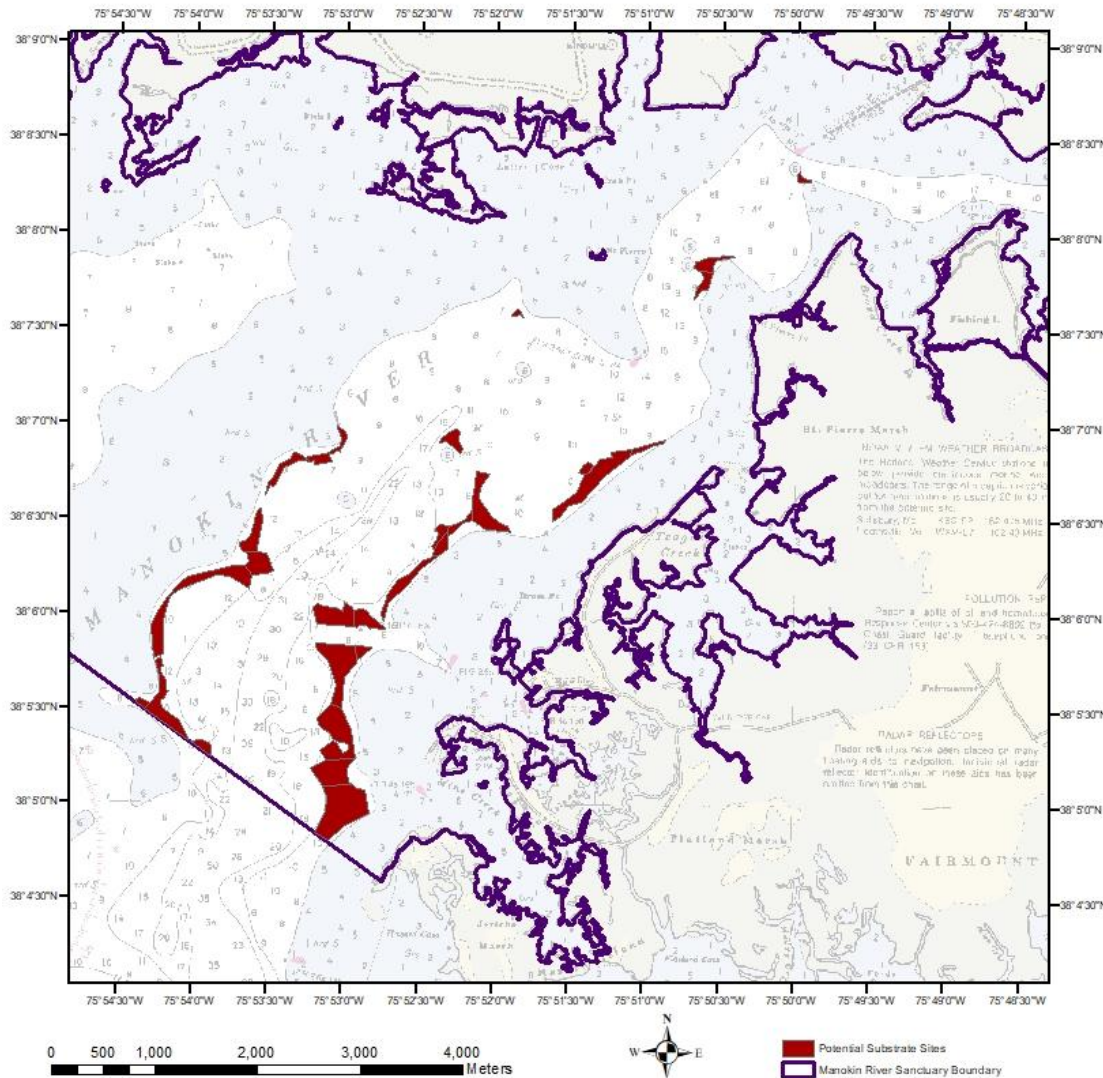
Pre-Construction Groundruthing Survey



5 Benthic Habitat Components Evaluated

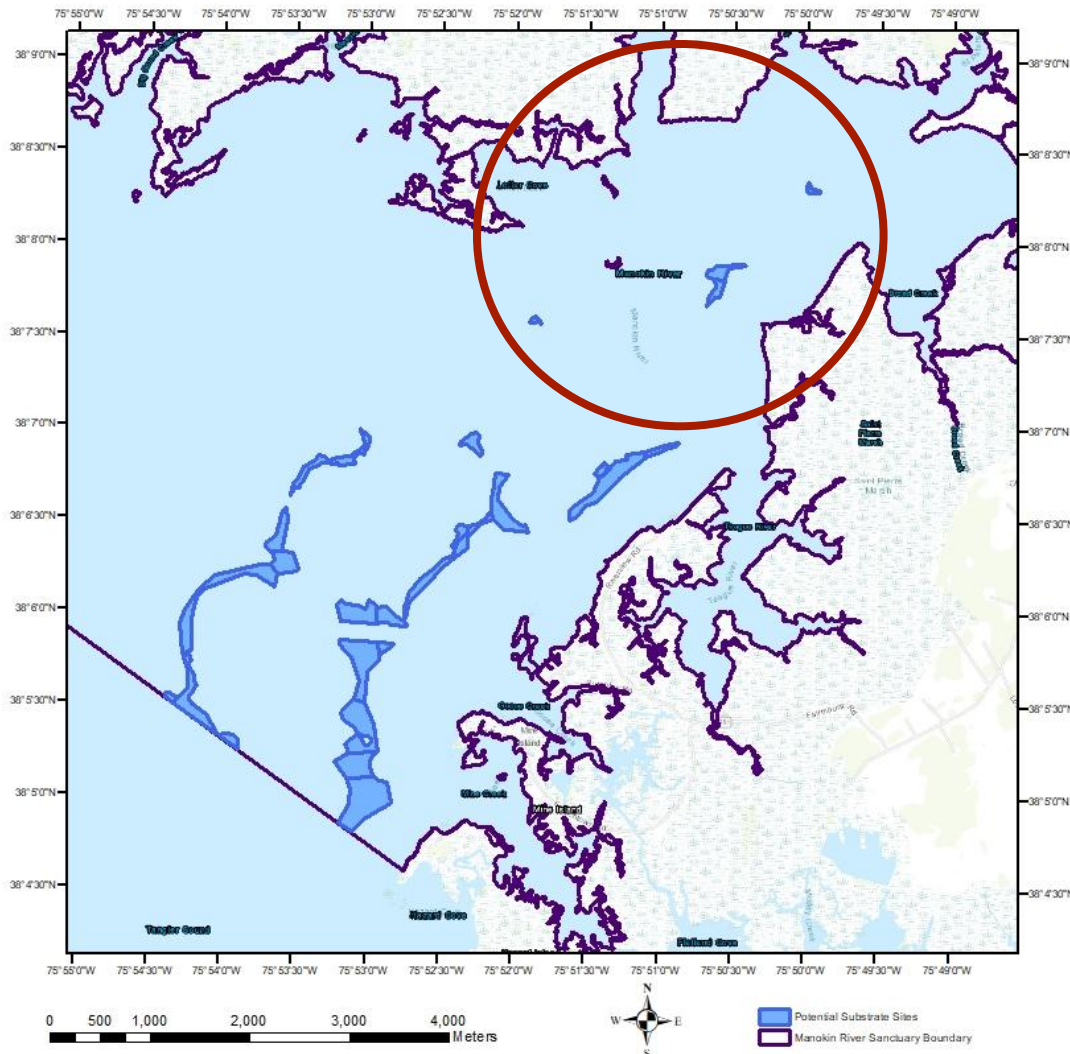
1. % exposed shell
2. Substrate type-
primary and
secondary
3. Surface sediment-
depth in centimeters
4. Density live oysters
5. Surface shell volume

Substrate and Seed



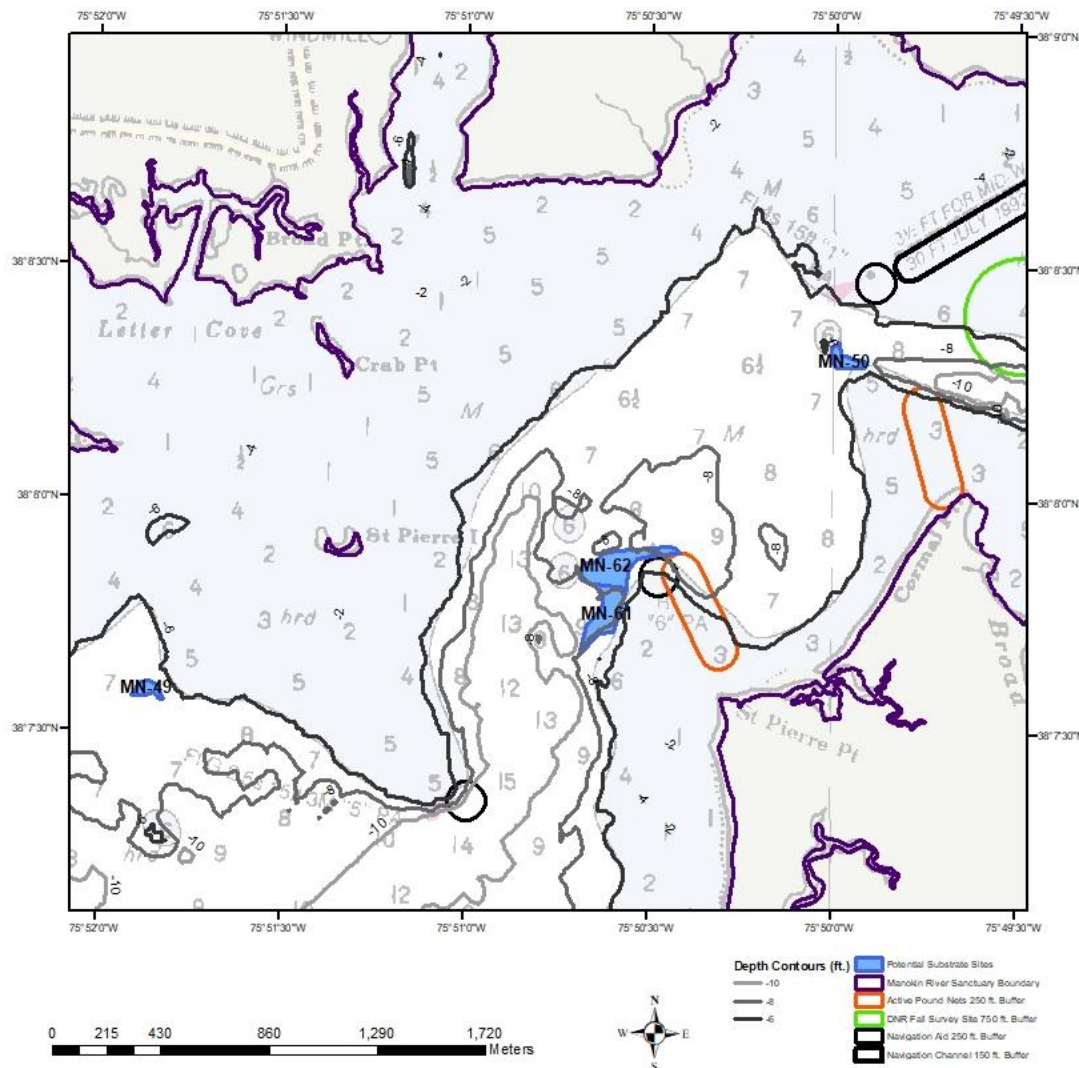
Potential
substrate &
seed reef
construction
sites

Reef Areas MN-50, MN-62, MN-61 and MN-49



Overview of
upstream
potential reef
construction
areas

Reef Areas MN-50, MN-62, MN-61 and MN-49

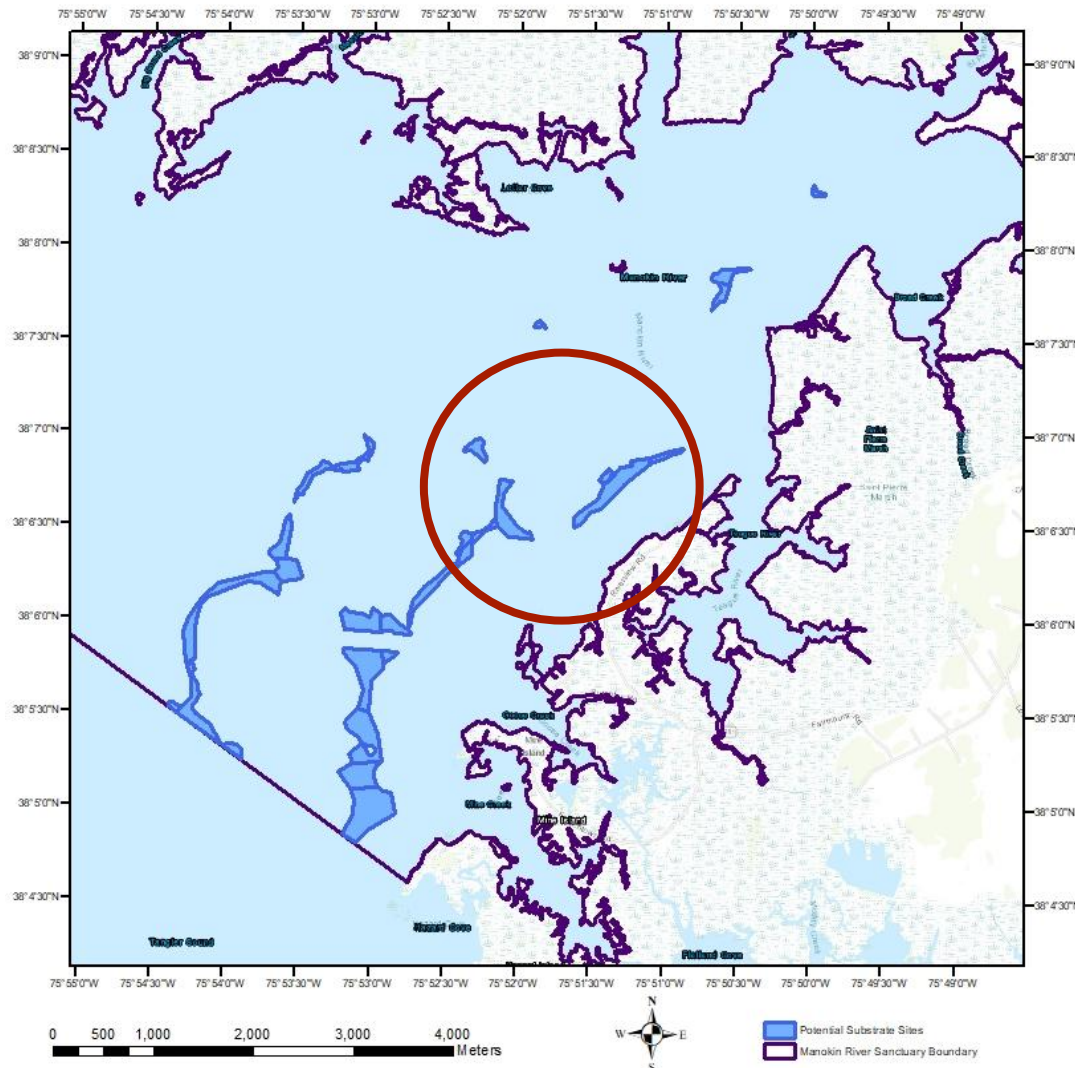


Overview of
upstream
potential reef
construction
areas

Reef Areas MN-83, MN-38, MN-79, MN-52, MN-81, MN-85, MN-28, and MN-84



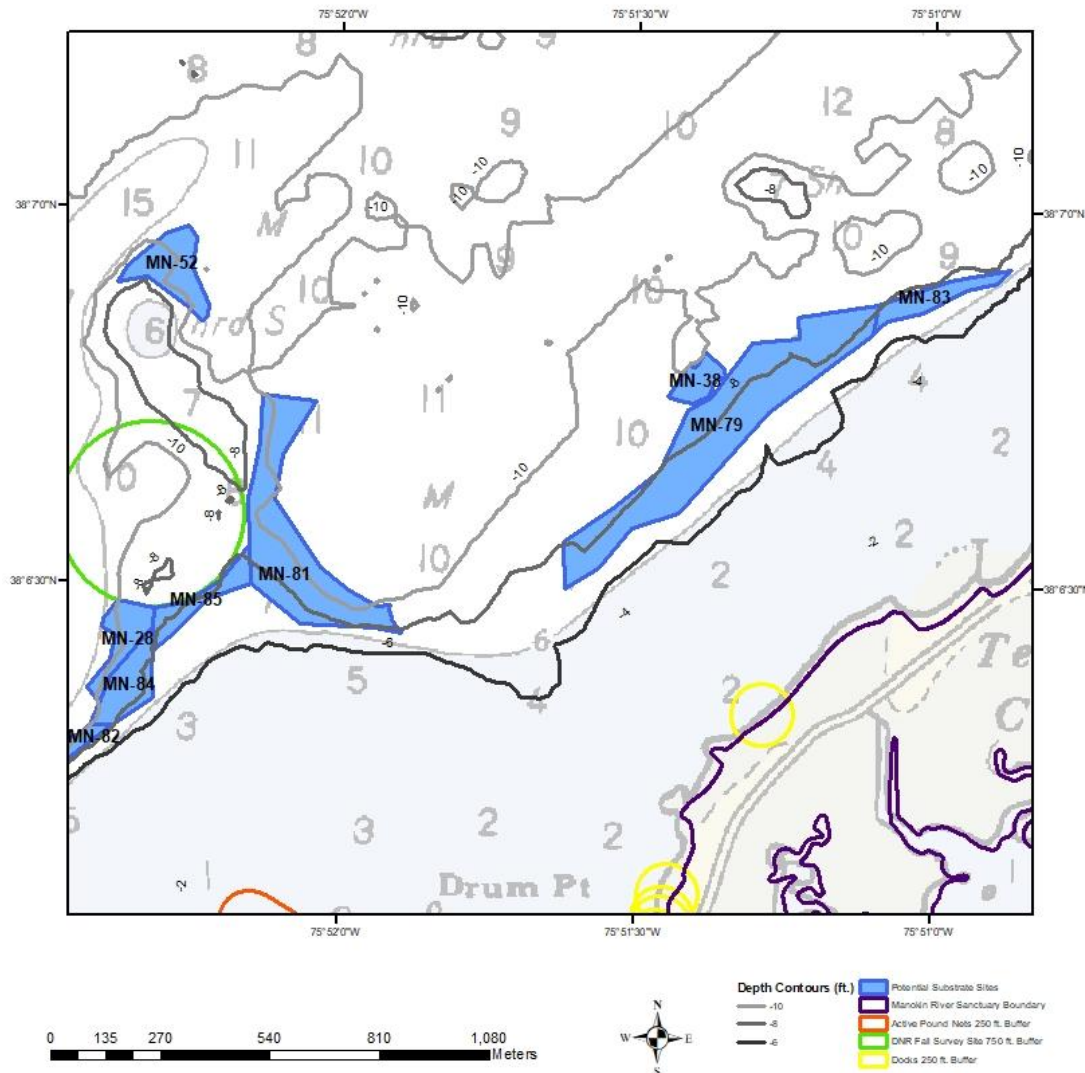
Overview of midstream potential reef construction areas



Reef Areas MN-83, MN-38, MN-79, MN-52, MN-81, MN-85, MN-28, and MN-84

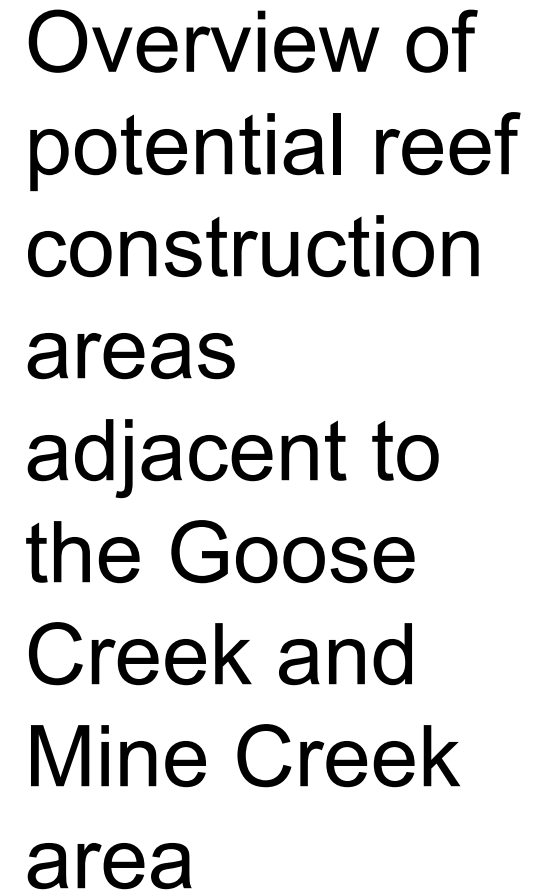


Overview of midstream potential reef construction areas

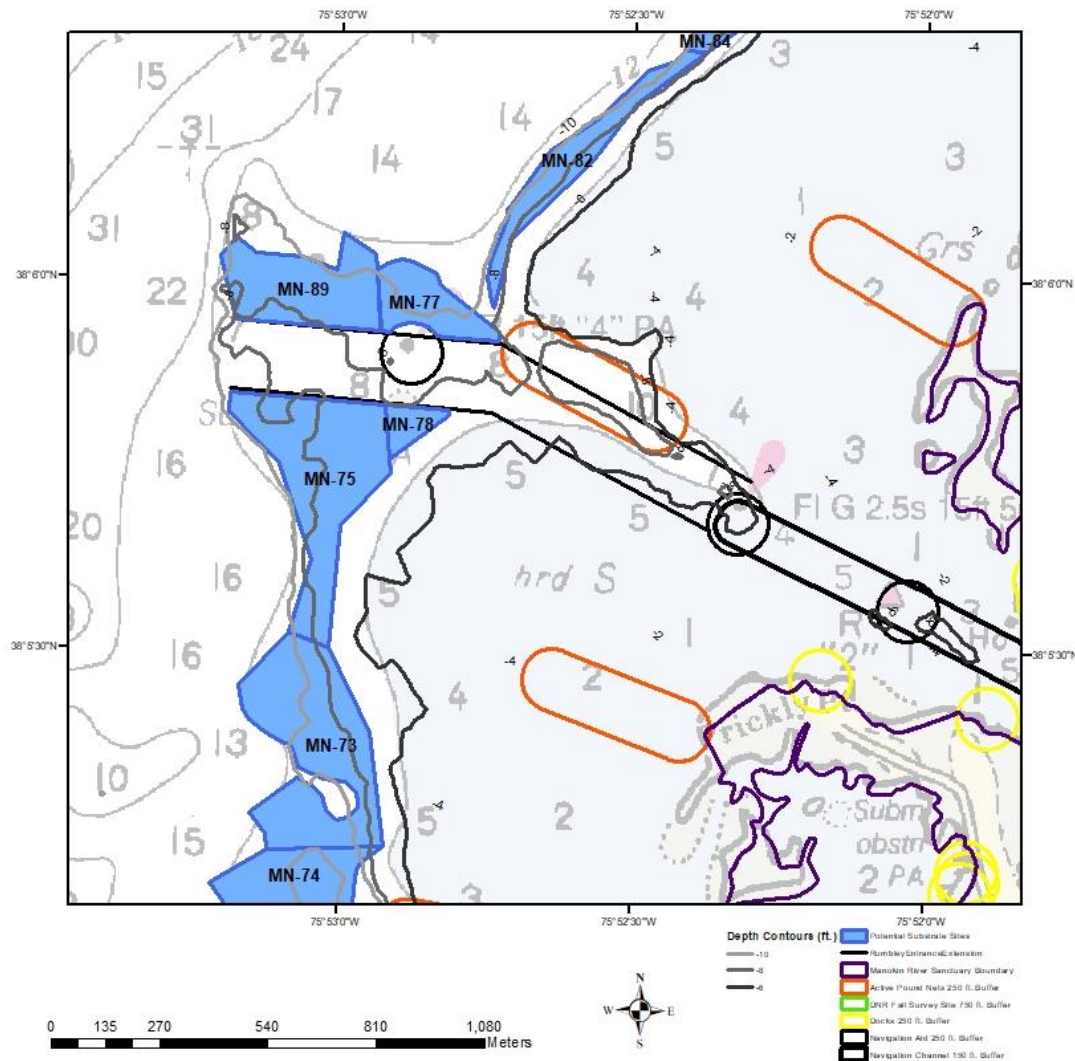




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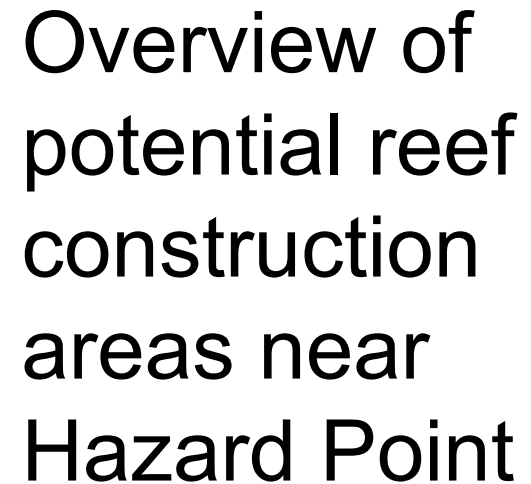
Reef Areas MN-82, MN-77, MN-89, MN-78, MN-75, and MN-73



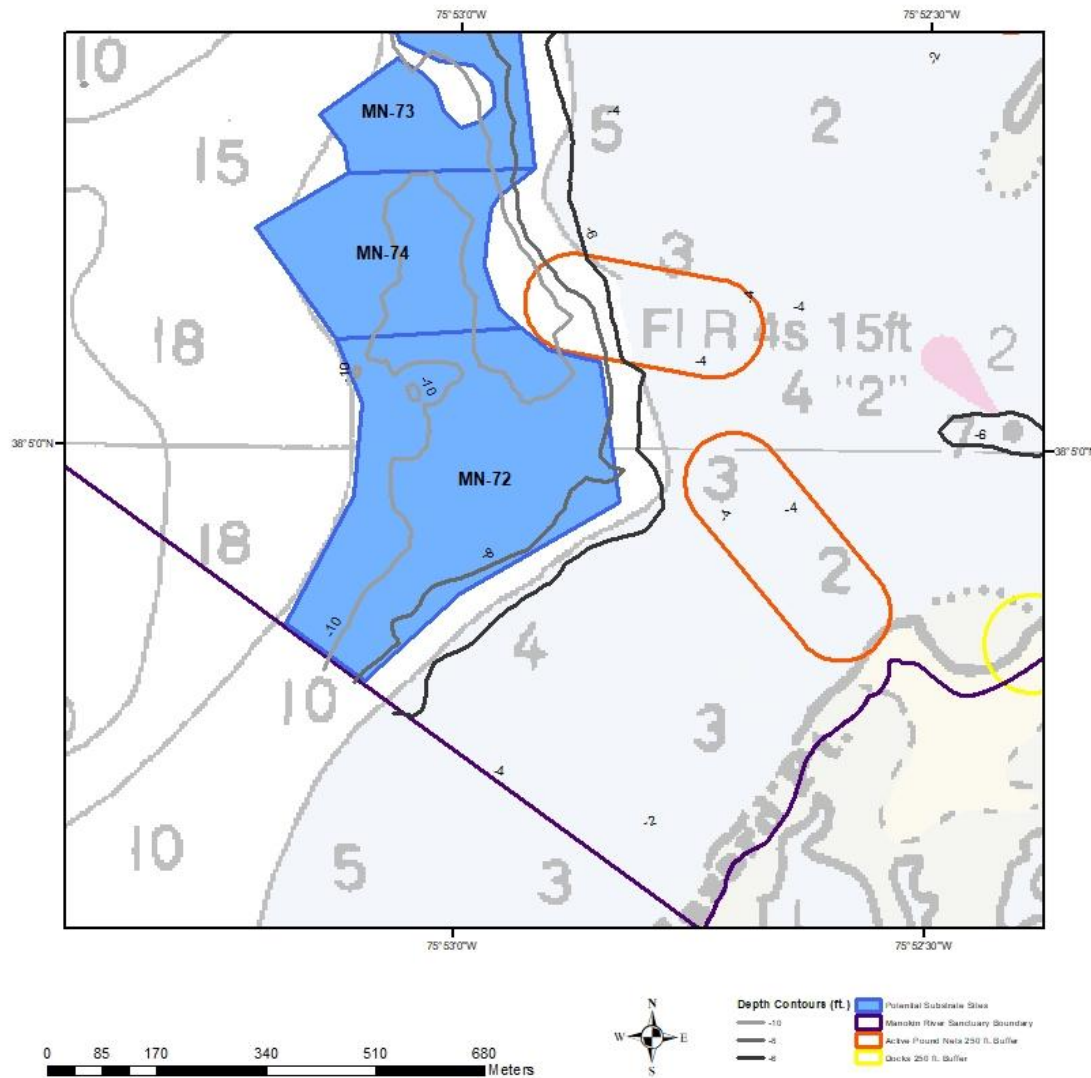
Overview of potential reef construction areas adjacent to the Goose Creek and Mine Creek area



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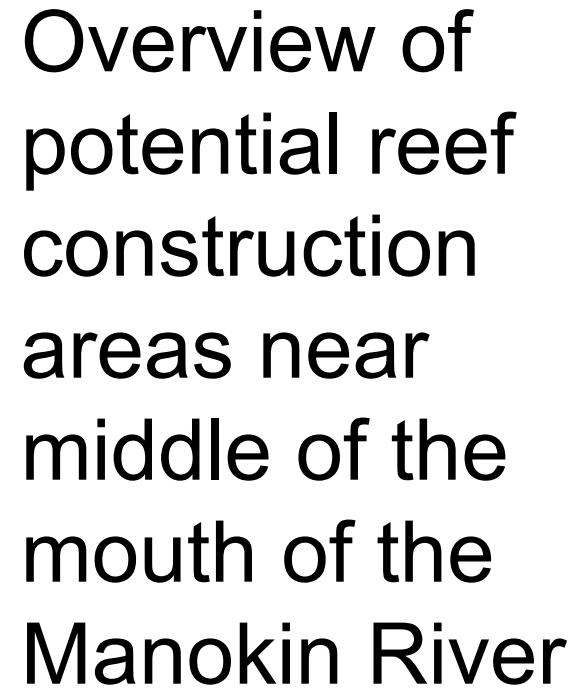
Reef Areas MN-74 and MN-72



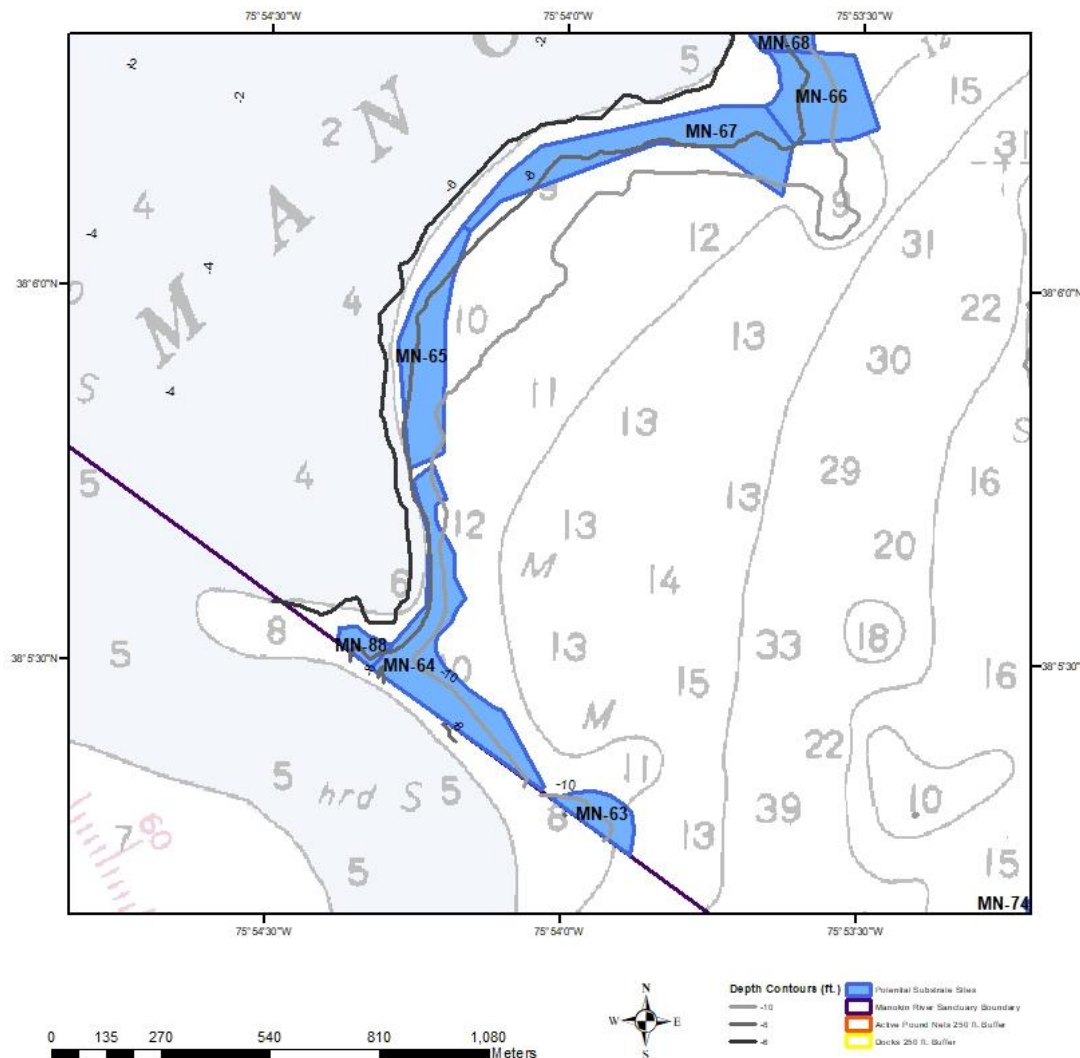
Overview of potential reef construction areas near Hazard Point



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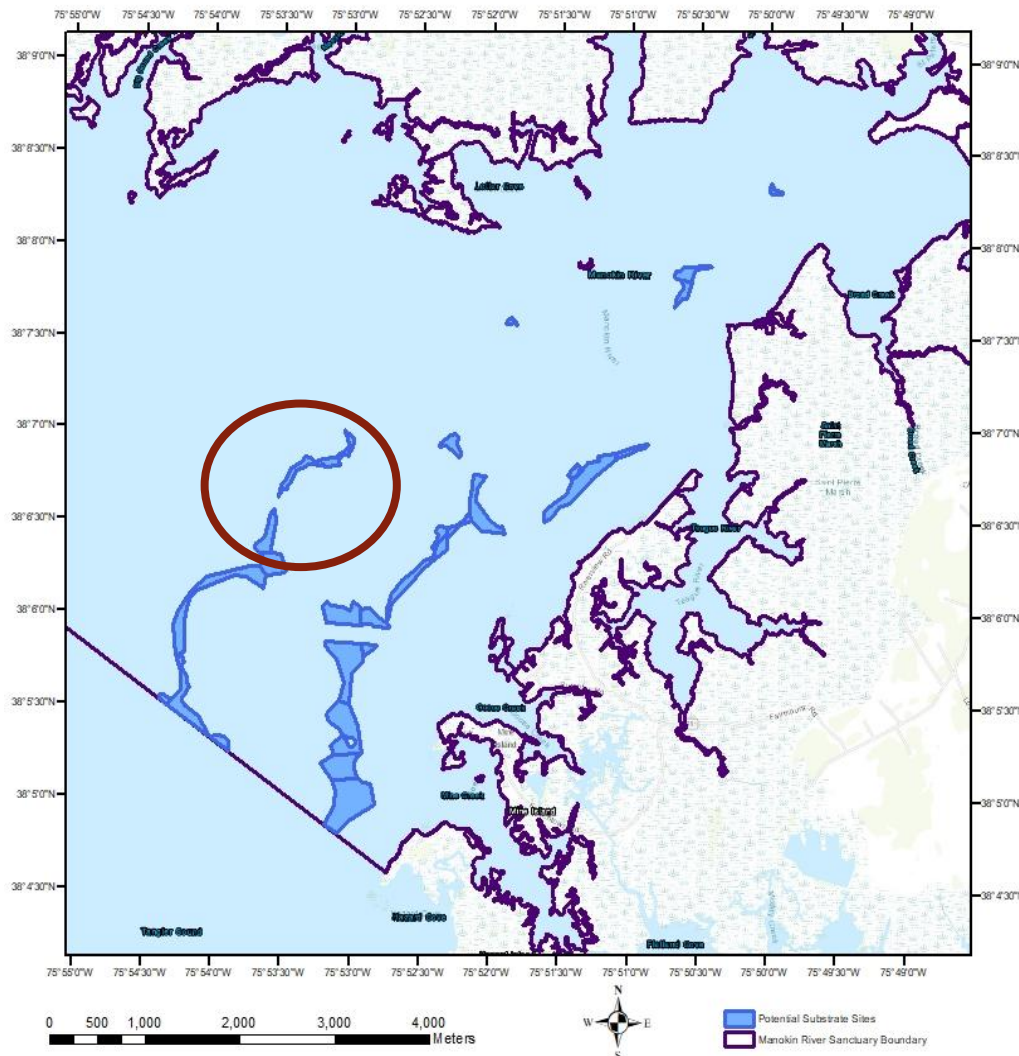


Reef Sites MN-66, MN-67, MN-65, MN-64, MN63 and MN-88



Overview of potential reef construction areas near middle of the mouth of the Manokin River

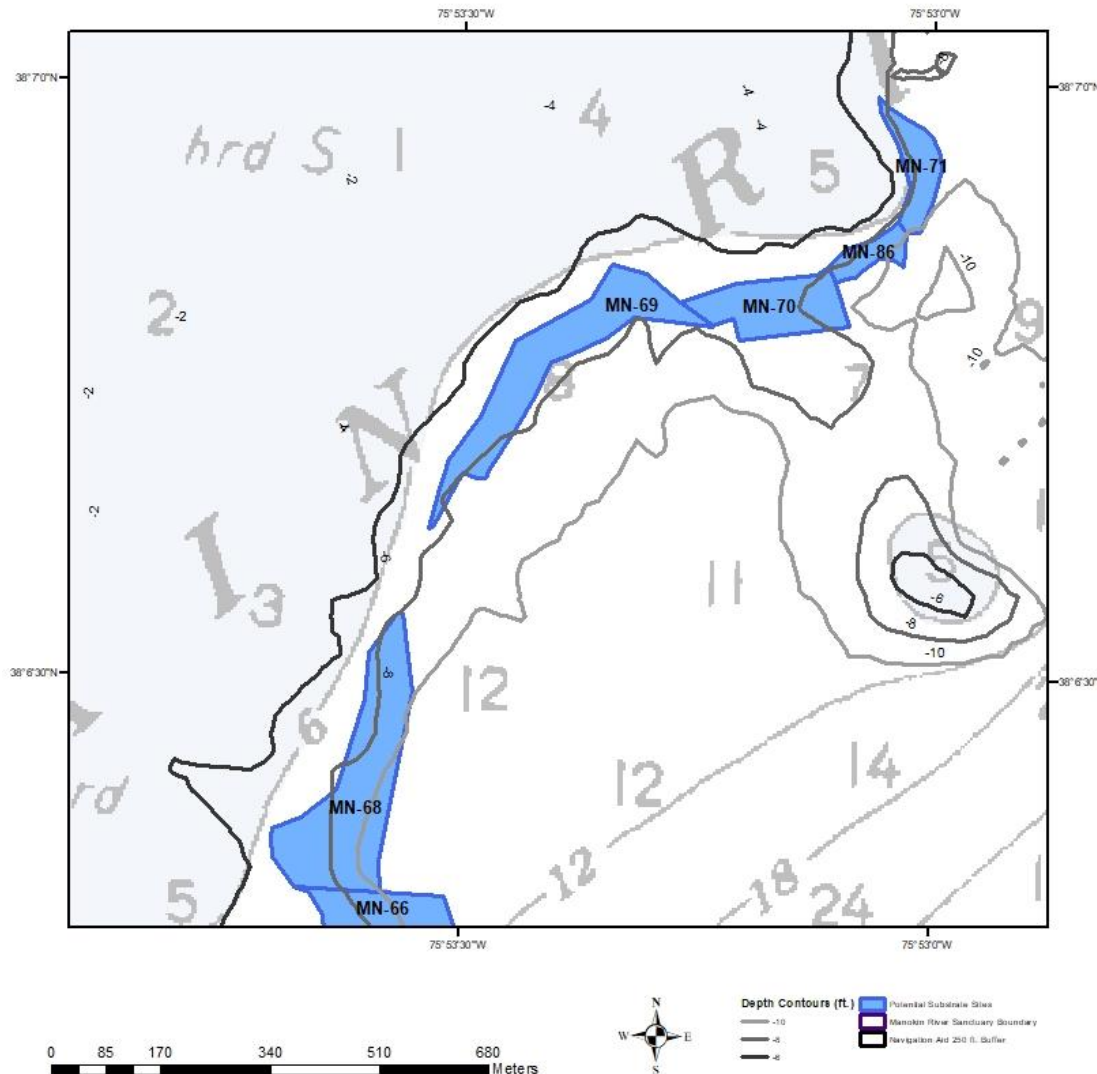
Reef Areas MN-71, MN-86, MN-70, MN-69 and MN-68



Overview of potential reef construction areas near middle of the Manokin River

Reef Areas MN-71, MN-86, MN-70, MN-69 and MN-68

Overview of
potential reef
construction
areas near
middle of the
Manokin River



Proposed Substrate

Stone- granite, amphibolite, or limestone

- 3"- 6" stone for a 12" reef base
- Some reefs may be built less than 12" to address site specific concerns
- Specific reefs to receive restoration (minimum of 137 to 175 acres) will be selected from the 333 acres presented (31 reefs) after a systematic patent tong surveys are conducted to groundtruth the areas
- Sites for construction are located in 7'- 20' pre construction water depths
- Priority for construction will be given to deeper reefs

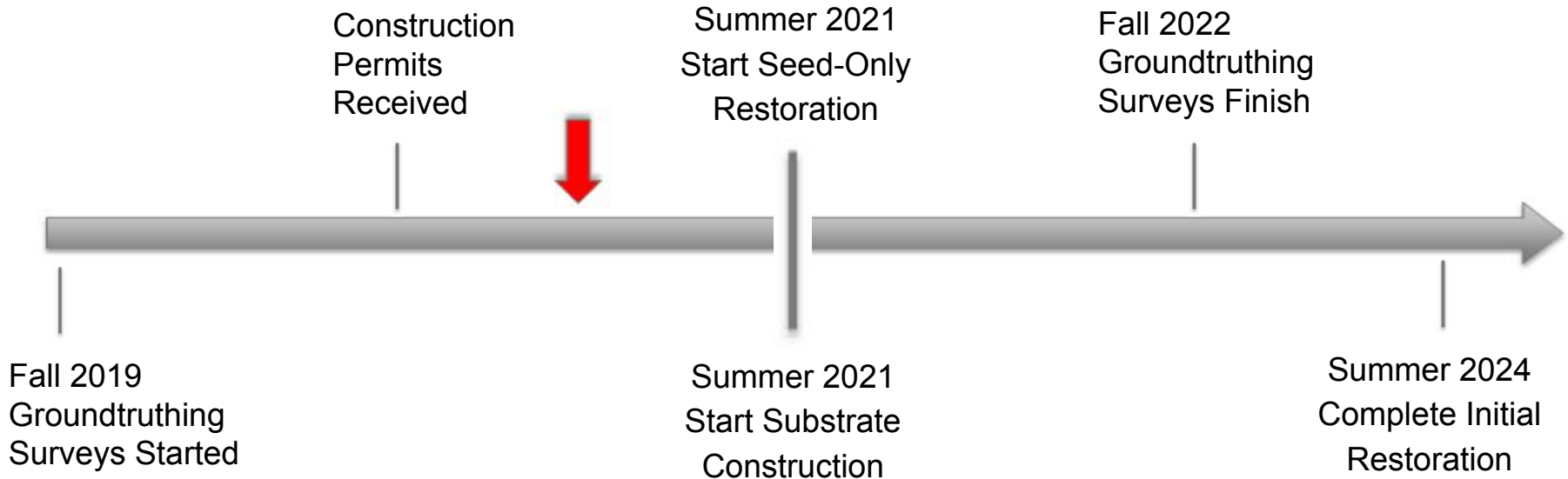


Additional Information



- Buoys
- Barges
- Bathymetry

Projected Timeline



Next Steps



Please review all substrate and seed locations.

DNR is soliciting comments for these substrate and seed sites.

Manokin Blueprint

https://dnr.maryland.gov/fisheries/Documents/ManokinRiver_Oyster_Restoration_Tributary_Plan.pdf

Comments can be sent to laurinda.serafin@maryland.gov or by attending a virtual meeting on Tuesday, Feb. 23 at 5:30 p.m.